Provirus Hypothesis Encyclopedia Article

Provirus Hypothesis

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Provirus Hypothesis

American virologist **Howard Temin** proposed the provirus hypothesis. The hypothesis arose from Temin's observations that the Rous sarcoma **virus**, which has **ribonucleic acid** (**RNA**) as its core genetic material, could not infect a **cell** once the cell's synthesis of **deoxyribonucleic acid** (**DNA**) was stopped. Temin formed a possible explanation, the provirus hypothesis, claiming that the RNA of the invading virus is somehow copied or translated into the DNA of the host cell. As a result, the reproductive activity of the cell would be altered and the cell would become cancerous.

Temin's provirus hypothesis met with skepticism, as the prevailing dogma at the time was that genetic information passed only from DNA to RNA. However, working independently, Temin and **David Baltimore** proved, in 1970, that the hypothesis was correct. They identified the viral enzyme dubbed **reverse transcriptase**, which functions to pass genetic information to DNA from RNA.

This work has been useful in **cloning**, genetic engineering and research on **AIDS**, which is caused by a **retrovirus**. For the formulation of the provirus hypothesis and for sharing in its validation, Temin shared the 1975 Nobel Prize for physiology or medicine with Baltimore and **Renato Dulbecco**.